Introducing personal learning environments to informal learners: lessons learned from the OpenLearn case study

Conference or Workshop Item

Introducing Personal Learning Environments to Informal Learners: Lessons Learned from the OpenLearn Case Study

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Abstract. Personal Learning Environments (PLEs) hold the potential to address the needs of informal learners for multi-sourced content and easily customisable learning environments. This paper presents the lessons learned from a case study regarding the use of widget-based PLEs by informal learners for finding and evaluating Open Educational Resources (OER). The lessons learned from this case study have allowed the authors to detect some of the obstacles for the successful adoption of PLEs by informal learners, as well as to identify ways for overcoming these obstacles.

Keywords: personal learning environment, open educational resource, informal learning

1 Introduction

Personal Learning Environments (PLEs) are gradually gaining ground over traditional Learning Management Systems (LMS) by facilitating the lone or collaborative study of user-chosen blends of content and courses from heterogeneous sources, including Open Educational Resources (OER).

The implementation of PLEs for supporting informal learners involves a number of challenges. PLEs entail a significant amount of new learning technologies and methodologies that are largely unfamiliar to the communities of informal learners. This paper presents the lessons learned from a case study in informal learning, regarding the use of PLEs for finding and evaluating OER. The outcomes of this case study aim at informing Technology-Enhanced Learning (TEL) stakeholders about some of the problems and solutions for the successful implementation and delivery of PLEs to communities of informal learners.

The remainder of this paper is organised as follows: Section 2 describes the background and introduces the main concepts related to this work. Section 3 presents the OpenLearn case study and section 4 discusses the methodology adopted for evaluating PLE solutions within this case study. Section 5 discusses the evaluation

results and section 6 presents the overall lessons learned from this case study. Finally, the paper is concluded in section 7 and the next steps of this work are outlined.

2 Background

The Learning Management System (LMS) has dominated Technology-Enhanced Learning (TEL) for several years. It has been widely used by academic institutions for delivering their distance learning programmes, as well as for supporting their students outside the classroom. The LMS has been a powerful tool in the hands of educators, enabling them to complement face-to-face teaching in the classroom with remote work by individual students, as well as groups of them. Popular examples of such systems used by the academic and the business world include Blackboard (www.blackboard.com), Moodle (http://moodle.org), and Sakai (http://sakaiproject.org) [1, 3, 17, 18].

However, the advent of Web 2.0 has altered the landscape in TEL. Learners nowadays have access to a variety of learning tools and services on the web. These tools and services are usually provided by different vendors and in many cases are open and free. Repositories like Wikipedia (www.wikipedia.org), YouTube (www.youtube.com), SlideShare (www.slideshare.net) and iTunes U (www.apple.com/education/itunes-u) offer access to a wide range of learning materials for free. Augmenting and configuring the diverse and distributed Web 2.0 tools and services in order to address the needs and preferences of individual learners is a significant challenge for modern online learning environments.

As opposed to formal learning, which is mostly instructor-led, informal learning is driven by self-study and the initiative of individuals, as well as communities of learners with common goals. The transition from the traditional approach of LMS to Web 2.0-based learning solutions bears significant benefits for informal learners. It puts emphasis to their needs and preferences, providing them with a wider choice of learning resources to choose from. In addition, the success of initiatives such as the Khan Academy (www.khanacademy.org) has proven the importance of Web 2.0-enabled crowdsourcing in informal learning.

The Personal Learning Environment (PLE) is a facility for an individual to access, aggregate, manipulate and share digital artefacts of their ongoing learning experiences. The PLE follows a learner-centric approach, allowing the use of lightweight services and tools that belong to and are controlled by individual learners. Rather than integrating different services into a centralised system, the PLE provides learners with a variety of services and hands over control to them to select and use these services the way they deem fit [5, 6, 19].

The emergence of the PLE has greatly facilitated the use and sharing of open and reusable learning resources online. Learners can access, download, remix, and republish a wide variety of learning materials through open services provided on the cloud. Open Educational Resources (OER) can be described as “teaching, learning and research resources that reside in the public domain or have been released under an

intellectual property license that permits their free use or repurposing by others depending on which Creative Commons license is used" [2].

Self-regulated learning (SRL) comprises an essential aspect of the PLE, as it enables learners to become "metacognitively, motivationally, and behaviourally active participants in their own learning process" [20]. Although the psycho-pedagogical theories around SRL predate very much the advent of the PLE, SRL is a core characteristic of the latter. SRL is enabled within the PLE through the assembly of independent resources in a way that fulfils a specific learning goal. By following this paradigm, the PLE allows learners to regulate their own learning, thus greatly enhancing their learning outcomes [8, 14].

Although the benefits of PLEs may seem quite obvious, the adoption of these technologies and the associated learning methods in different learning contexts can be hindered by certain obstacles. For example, the adoption of PLE-based solutions in the workplace is influenced by certain business factors, such as the perceived cost-effectiveness of these solutions, their compatibility with existing solutions, their strategic alignment with organisational goals, as well as the attitude of the organisation's leadership towards change [4]. The present paper attempts to shed some light into the challenges and issues related to the adoption of PLEs in informal learning.

3 The OpenLearn Case Study

The European project ROLE (Responsive Open Learning Environments - www.role-project.eu) is aiming at empowering learners for lifelong and personalised learning within a responsive open learning environment. In order to study and evaluate the applications of PLEs in a variety of learning contexts, the ROLE project has setup a number of test-beds. The ROLE test-beds cover a wide variety of rich contexts in which there is potential for significant impacts of both personal learning and responsive open learning environments. Each test-bed concentrates on researching a large sample of representative individuals; this enables ROLE as a whole to collect experiences covering a large variety of learning contexts and requirements.

The Open University (OU), UK comprises one of the ROLE test-beds, concerning the learners' potential transition from formal to informal learning. This transition is being implemented within this test-bed as a transition from the traditional LMS towards the PLE paradigm [10-13].

The test-bed in question is the OER repository OpenLearn offered by the OU. OpenLearn (http://openlearn.open.ac.uk) currently offers in excess of 6,000 hours of study materials in a variety of formats. These include materials repurposed as OER from original OU courses i.e. formal delivery as well as bespoke OER created by both OpenLearn academics and non-OU educators, i.e. enabling informal delivery.

OpenLearn users are primarily informal learners, who want to find and study OER either individually or in collaboration with others. These learners can be in formal education e.g. taking an accredited University course elsewhere and simply looking for additional materials to add value to their primary course or they maybe, what is often described as, "leisure" learners i.e. those who simply want to learn for themselves with no expectation of formal accreditation.

OpenLearn currently uses Moodle as a LMS platform. Therefore, in order to add value to those potential learning experiences, this test-bed has endeavoured to raise awareness of PLEs with both the OpenLearn project team as well as with selected parts of the wider OpenLearn community. The OpenLearn test-bed is measuring some of the expectations, perceived benefits and difficulties of implementing a PLE in this environment. Thus, in effect, enabling the assessment of the overall aim by measuring the transition from formal to informal learning as witnessed through OpenLearn staff and students.

This transition attempts to transform and improve the OpenLearn user's experience by enabling individuals to build and personalise their learning environment thus gaining more control over the potential manipulation and production of as well as use of OER study materials. In addition, the adoption of certain ROLE widgets inside study units of the OpenLearn Moodle platform is offering further value to those users by supporting a stronger framework to foster particular communities. This presents an opportunity to individual informal learners to be part of a shared learning experience instead of their current potential lone study.

OpenLearn is a pioneering initiative in the production and dissemination of OER, both within the UK and worldwide. In the context of ROLE, we are therefore drawing upon two significant factors that OpenLearn has brought to the OER field: scale and experience [9]. Scale in terms of the quality of archive material available that can be repurposed in varying degrees for online dissemination, and also in terms of developing robust systems (both technological and pedagogical) that provide a meaningful learning experience to large student populations. Experience in terms of producing distance education material that is designed to be studied by informal learners, who often have competing demands on their time, and a range of needs and experience.

By drawing upon these factors, we are reaching out to a global audience of informal learners, in order to raise awareness about PLEs through specialised OER. These OER introduce the core concepts behind ROLE and PLEs and allow the use of ROLE tools with guidance from structured learning activities. Figure 1 shows such a learning activity, where the learner is invited to use a ROLE widget in order to complete a series of tasks. The ROLE OER are available as free study units in OpenLearn and can be downloaded, remixed and republished. The people who study these units are also encouraged to provide their feedback and suggestions about the ROLE tools and PLEs in general.

More specifically, the following ROLE OER are currently available as study units in OpenLearn:

- *Responsive Open Learning Environments* (http://labspace.open.ac.uk/course/view.php?id=7433): This course provides an overview of the concepts behind PLEs and also demonstrates a selection of learning tools that have been developed by ROLE.
- *Self Regulated Learning* (http://labspace.open.ac.uk/course/view.php?id=7898): This course introduces the concept of SRL and guides learners into using the ROLE tools in order to apply the SRL principles into their own learning.

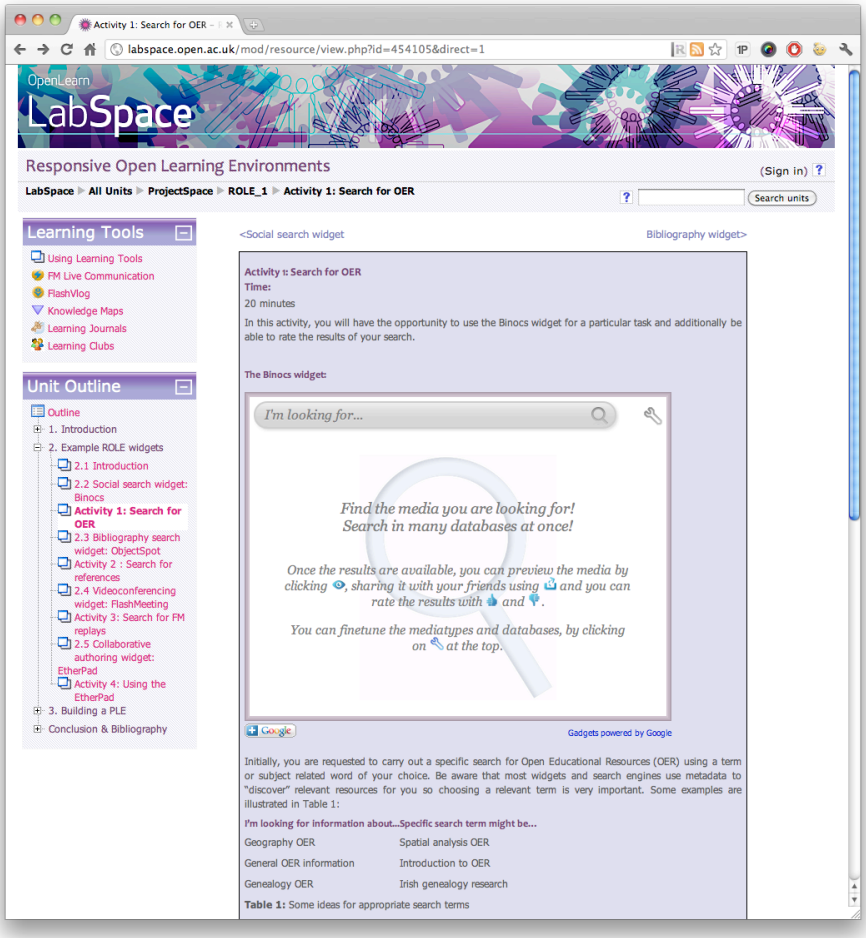

Figure 1. A learning activity featuring a ROLE widget inside an OpenLearn course

4 Methodology

Qualitative and quantitative data were collected through a number of different research instruments. Introductory workshops were organised presenting the basic scenario of a PLE to the audience, followed by an opportunity to experience using pre-selected ROLE tools implemented into a dedicated OpenLearn study unit. The underlying theme of the workshops was: "Finding and evaluating OER", but the flexible nature of the embedded activity was such that individuals could tailor this theme to meet their own specific needs i.e. by choosing to look for or discover OER pertinent to their own subject areas. Two workshops were conducted using ROLE tools with two different groups, i.e. one with learners and one with educators. Collecting feedback from each group was organised through a survey. This generated both quantitative as well as qualitative data. Representatives from the ROLE project were present at each workshop to deliver information and to circulate during the hands-on part of the session. This was an excellent opportunity to hear how individuals did or did not engage with the ROLE tools. It was a chance to collect some direct qualitative data through comments and feedback from participants.

The first workshop took place at the Joint European Summer School on Technology Enhanced Learning (JTEL) in Crete, May 2011. Participants were 25 postgraduate students from universities across Europe. The JTEL Summer School is an annual event and offers an opportunity for PhD students, in different subject areas, in TEL to meet, exchange knowledge and develop their research skills whilst engaging with the active TEL community of practice. The second workshop took place at The Open University, Milton Keynes, UK in July 2011 and was attended by 10 educators. It was organised in conjunction with the Support Centre for Open Resources in Education (SCORE). SCORE offers a variety of support mechanisms to the OER community in England. The attending SCORE Teaching Fellows are appointed from a cross-section of English Higher Education Institutions (HEIs).

A similar but not identical, workshop format was used at each event. Whilst the workshop basis was the same (e.g. setting the scene, describing PLEs etc.), the hands-on materials and pre-selected ROLE tools were tailored for the different audiences. After a short introductory presentation about ROLE and PLEs a short question and answer session followed. The main hands-on section of the workshop was then delivered in the form of an activity. Essentially participants were asked to visit the dedicated OpenLearn webpage shown in Figure 2. This enabled the participants to access a group of pre-selected ROLE tools in the form of widgets.

Participants were asked to use the two pre-selected ROLE search widgets called Binocs and ObjectSpot. Engaging in this activity would enable them to find OER that would be suitable to support them in their respective research or teaching scenarios. A third widget, accessing an EtherPad, was also available for this activity and it enabled participants to report their findings in a collective electronic notepad format. At the end of each workshop, a group discussion was also held with the participants contributing about their experiences of using the ROLE tools.

Additionally, the participants were asked to answer a short online survey (see https://fit-bscw.fit.fraunhofer.de/pub/bscw.cgi/39223921). The purpose of this survey was to gather user feedback both specifically about the ROLE widgets, as well as more generally about the perceived usefulness and ease of use of PLEs, via questions based on the Technology Acceptance Model (TAM) [7, 15, 16].

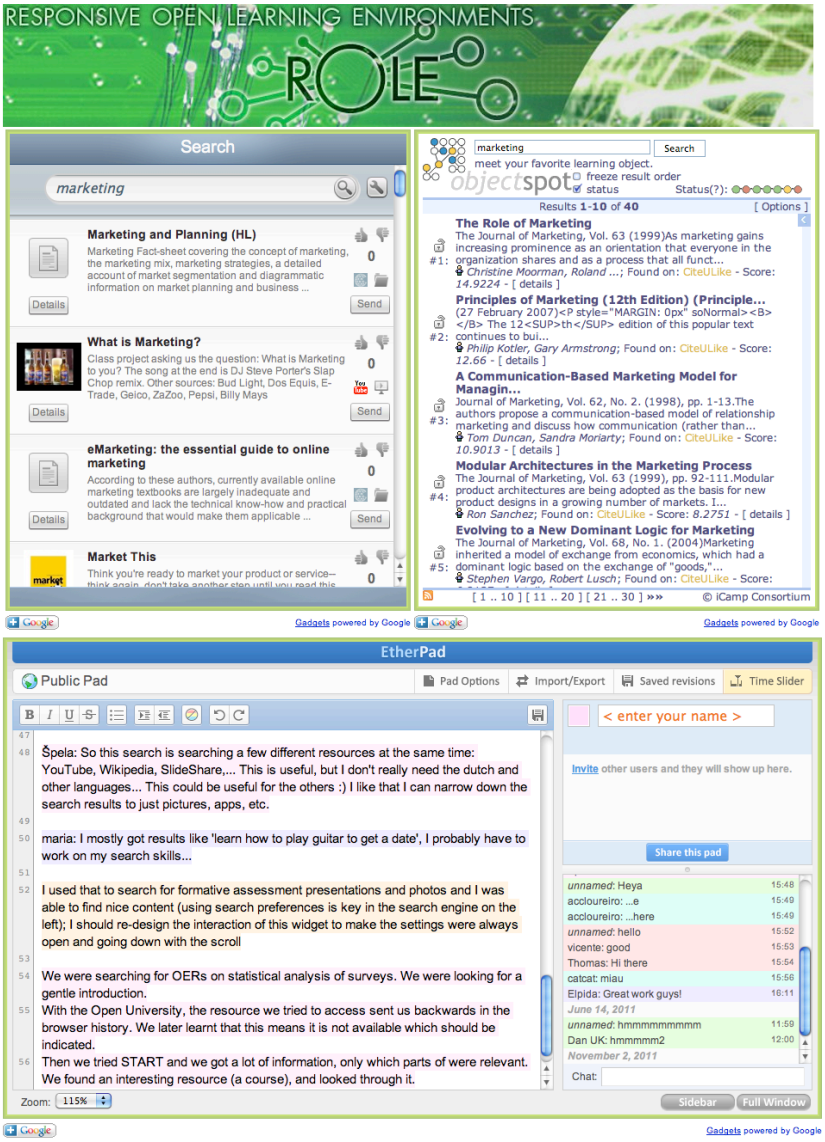

Figure 2. The setup of learning tools used in the "Finding and evaluating OER" workshops

5 Results

The results of both workshops were recorded in a number of formats. It is fair to say that primarily quantitative data was collected from the questionnaire whilst the majority of the qualitative data was collected in situ when facilitators circulated amongst the participants. Secondly, however, some supplementary qualitative data was also gathered electronically via the pre-selected ROLE tool that enabled participants to access the EtherPad and record their experiences as they happened. In general, some participants were comfortable with using the EtherPad whilst others were most definitely unable to grasp the concept or indeed use it effectively. It was for this reason that the facilitators at each workshop collated notes of what they observed and heard during each event. It is important to note that the questionnaire also contained a number of semi-structured questions permitting free text individual responses.

Overall, the two events were deemed to be very successful. The introduction about the remit of PLEs set the scene and, additionally, participants appreciated the opportunity to use the selected ROLE tools thus the workshops were warmly received by both audiences.

The first event, as previously mentioned, took place during the JTEL Summer School in Crete, May 2011. The audience comprised of PhD students all of whom were aged between 21 and 40. There was an even split between the genders. Most participants declared that they had a good knowledge of TEL (73%) whilst the majority also indicated that they had "some" knowledge of OER (73%). The purpose of the workshop being that participants were encouraged to use the ROLE tools to seek out appropriate OER materials that would support them in their subject areas of research.

In general the JTEL participants overall opinion of using the ROLE tools as part of the learning activity in the workshop was a positive one. Participants recorded in the free text responses of the questionnaire that their experiences of using the tools were "*...useful, especially the search widgets*" along with "*LOVED THEM!!! I found them really useful both for search and collaboration*" and "*a great idea*". Collating the responses to the fifth question (What did you think of the widgets of the learning activity?) which was also a free text response, one can see that the overall opinion recorded was positive (80%) alongside a much smaller negative response (10%) as well as a small neutral response (10%).

With relation to the perceived usefulness and ease of use of PLEs, the responses were much more mixed (see Figure 3a). Interestingly the groups' strongest opinion related to the statement "Using a PLE would improve my motivation for learning" where some 57% registered a neutral response to this premise. Other strong opinions were also voiced in respect of the statements "*I would find a PLE useful for my work*" where some 52% agreed with 21% strongly agreeing and "*I would find interacting with a PLE requires a lot of mental effort*" invited a 52% disagreement to be recorded. This would suggest that many of the participants recognised that using a PLE required some effort initially along with a discerning thought process but such

effort would offer individuals greater benefits in the long run. The remaining statements in this question invited a more evenly spread set of responses.

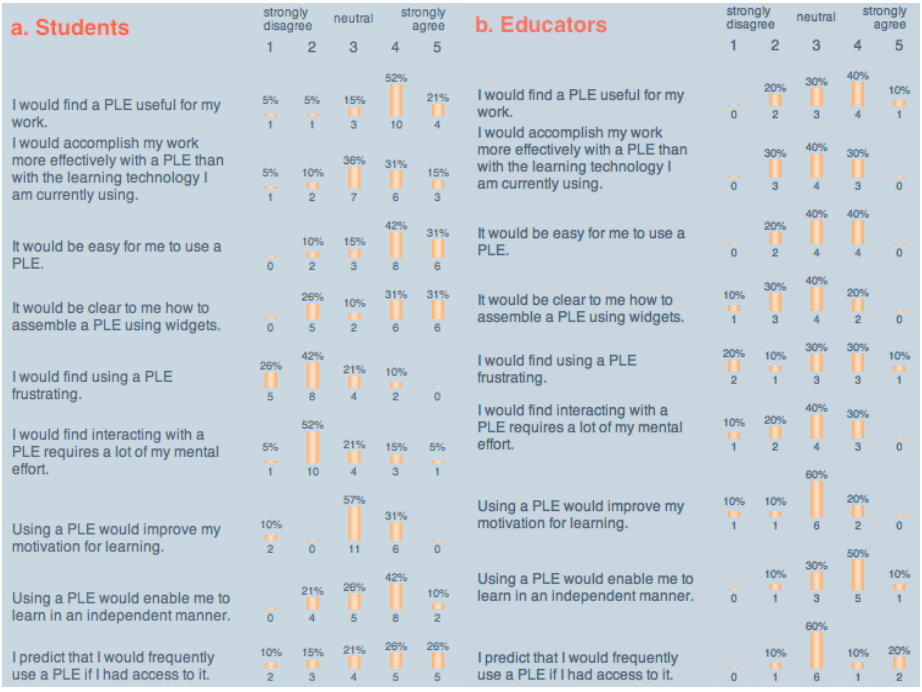

Figure 3. Responses of (a) students and (b) educators regarding the perceived usefulness and ease of use of PLEs

Question 7 related to the main premise of the workshop, i.e. the participants' success in finding relevant OER results from their enquiry using one of the ROLE tools (either Binocs or ObjectSpot). It was an opportunity, once again, for them to record their actual opinion using a free text response. Overall the majority (70%) recorded a positive use of the ROLE tools to find relevant OER materials, whilst a small number rated the experience as neither positive nor negative (20%). Only 2 participants, in fact, replied negatively (10%). Recorded comments to this question ranged from simply stating "*Yes*" through "*I found some very useful resources for my research*". Some participants chose to record exactly what they found e.g. "*Mainly videos and images*" or "*YouTube, Slideshare*" whilst others commented about the actual process, for example: "*...finding relevant* (materials) *ones is hard*" or "*It was good to be able to see how different licences can be used and how to use the resource for my work*".

Participants were also invited to record their opinions related to comments or questions for improving the ROLE tools. Significantly fewer responses were recorded

in response to this invitation (50% of group total). It is not clear why this is so. Nonetheless, some useful ideas were recorded, such as *"it would be useful that each resource had more indications about how rich it is. Not only number of comments, but also links, embedded content etc."* In other words, the participant recognised the value of the ROLE tool for his/her research work and wanted more relevant information to be displayed once a search query had completed i.e. that materials were situated in a wider context (in this case in relation to OER subject matters).

The EtherPad widget, as indicated earlier, was received by workshop participants in different ways. Most of the research students, in this JTEL event, actively used the tool although some were a little surprised by the real-time aspect of it "*...somebody is writing on my screen!!!! I am scared...*". Others considered additional aspects to the experience in that it highlighted some potential gaps in their own skill set "*...I probably have to work on my search skills...*". Overall, however, there was a positive, yet critical, response to this invitation indicating that the students who chose to record their thoughts in the EtherPad widget did give some considered attention to their discussion and/or notes.

Other interesting responses ranged from "*... I like that I can narrow down the search results to just pictures, apps etc*" to suggestions that "*...This one is very good! You find the licence and you search for it*" indicating, once again, that some students were discerning users of the ROLE tools and thinking through a number of previously unconsidered approaches or ways of using such search engines. Others focused on previous experience e.g. "*I used this tool in a conference, we took notes dude!*" as well as the not unusual student response of "*So... in the morning we can actually make notes together instead of coming to group therapy :)*" suggesting that virtual communication might be a replacement for those who were reluctant to be early risers.

The workshop facilitator also noted that students chose to work in teams of two and that no significant technical issues were experienced during the event. She noted that, in some cases, a number of students search results were irrelevant and that the majority of results appeared to return YouTube video links. The latter would appear to happen if all the options in Binocs, in particular, are left checked which is the default option of this ROLE tool. This may suggest that it would be better to leave the default delivery of the tool unchecked thus inviting users to select and check the search engines that are relevant to them/their research.

The facilitator also documented that the majority of students appeared to focus on the Binocs tool rather than the ObjectSpot tool depending upon the type of material that they were interested in finding. There may have been a number of reasons for this occurrence e.g. Binocs was offering OER related materials whilst ObjectSpot concentrated on bibliographic searches which may have been more easily identifiable to the students. She also recorded that at least half the group only used these two tools and did not appear to engage with the EtherPad tool at all. Again, as indicated earlier, there could be a number of reasons explaining this situation.

The second workshop took place with an audience of educators whose age profile was somewhat in contrast to the JTEL Summer School. The majority were SCORE

Teaching Fellows who were aged 30-50 with a 60:40% female:male division. Their knowledge of TEL also invited a wider range of responses in that 30% recorded themselves as "experts" with 40% stating "good knowledge" alongside 30% saying that they had "some knowledge". They also recorded an identical response in respect of their OER knowledge. Once again the purpose of the workshop was that participants were encouraged to use the ROLE tools to seek out appropriate OER materials that would support them in their subject areas of either their Teaching Fellow or "normal" research.

In respect to the question *"What did you think of the widgets of the learning activity?"* the educator participants responded with an even split between positive and neutral comments such as *"Good in principle, liked the ability to search file type. Needs wider range of search engines. Didn't work properly on the iPad"* as well as many responses of *"useful/nice idea/worked well in general"* in addition to *"... but would be even better if the search results were filtered for Creative Commons licenced items"* indicating that the educator recognised the potential of the search tool to be further refined.

As shown in Figure 3b, there was a rather mixed response to the set of questions about the perceived usefulness and ease of use of PLEs. Overall, most of the educators (ranging from 40-60%) registered that they were neutral in their opinion of the nine listed statements. Likewise, only 10-20% of participants registered either strongly agreed or disagreed views. For example, with respect to the statement "It would be easy for me to use a PLE", some 40% of the educators agreed but, as indicated earlier, another 40% held a neutral view of this statement alongside the remaining 20% registering that they disagreed.

In relation to the success of participants finding suitable OER materials via the ROLE tools again the response was 50:50 in respect of neutrality and strongly agreeing with the premise. It is difficult to ascertain why this is so other than suggesting that the participants appeared to be reasonably comfortable with the idea of using the ROLE tools even though some experienced technical issues recording that "*did not work on iPad*". It was noted by the facilitator and ROLE colleague present that there was a definite positive "buzz" amongst the audience during the learning activity. This manifested in a number of implicit ways: enthusiastic language being used amongst participants; a sense of excitement that emanated in above average noise levels for the group (N.B. The ROLE colleague in attendance is also a Teaching Fellow and a regular attender at these monthly SCORE events).

Question 8 related to the ease or difficulty of adaptation of the OER for the participants own purpose. Some 50% of the educators registered a neutral response with 30% recording that it was difficult along with the remaining 20% stating that it was very difficult to adapt their OER. This corroborated the previous premise that it is easy to find OER materials but less so to disaggregate the contents and repurpose or remix them to meet local needs.

With respect to the educators finding the learning activity useful for research needs and goals, once again the responses were evenly split (50:50) between a neutral stance and strongly positive. The actual comments centred on simple "*Yes*" replies through

"*useful but frustrating*" to "*It was useful to find that the search widget could be customised to a particular project's needs*" confirming that either the facilitator or ROLE colleague had explained that ROLE tools could be adapted to meet local needs too.

The final survey question requested comments or suggestions for improving the ROLE widgets. In exactly the same way as the JTEL Summer School workshop, this invitation revealed a limited number of responses. They were, however, helpful in terms of feedback for the ROLE tool developers and ranged from *"support or examples of good use would be helpful - the interface is not immediately intuitive"* through *"... the search needs to direct users towards OER repositories and/or Google results filtered by licence"* to *"the search results I got were not necessarily OER"*. The latter suggesting that definitions of what is being searched for need to be clearer as well as pre-selecting the most appropriate search engines/repositories rather than a wider set of resources that seem to confuse some of the end users.

It is fair to say that there was little engagement from the educators in this learning activity with regards to the EtherPad widget. Only 9 lines of text were recorded in it within this workshop compared to some 50 lines of text recorded during the earlier JTEL Summer School. To encourage use and demonstrate it, the ROLE facilitator used the EtherPad to record the location of the associated survey as an example of how further resources or links could be shared amongst a wider peer group. Nonetheless some useful information was recorded by the educators, one of whom remarked: "*... I was wondering how this search tool chooses content to display and how it displays the search results*". Once again indicating that those who engaged with all of the tools did so with discernment and thought sometimes anticipating further potential refinements to the tools.

6 Lessons Learned

It is possible to draw out a variety of lessons that have been learned from the transition from formal to informal learning workshops. These emergent themes centre around three main areas: the usability of the learning tools, consideration of the types and styles of the related learning activities formats, as well as both reflecting and acting upon suitable methods that encourage existing and potential future participants to be willing to consider, engage and continue using PLEs for their own learning purposes.

Before exploring the emergent themes, however, it should be noted that the learning tools selected for the previously described workshops were, in fact, only three of those currently available from the ROLE project. They were pre-selected as appropriate for these workshops in order to offer a collective opportunity for participants to seek out different types and styles of subject related OER materials for each group. The secondary aspect of each workshop was to raise awareness about the availability of OER to meet the participants' need to discover appropriate resources. It was also an implied intention both to introduce as well as increase participants'

knowledge of the wider area of PLEs to the selected audiences of two separate groups of students and educators.

The first theme of usability focuses around the capacity of any participant to not only use but also understand the use of the ROLE tools. Generally speaking, most people engaged with 2 of the 3 ROLE tools provided i.e. Binocs and ObjectSpot. The third ROLE tool, EtherPad, seemed much more problematic. Some participants simply avoided using it whilst others who did engage with it fully understood its role, facility and perceived usefulness. Indeed some members of both workshops remarked that they would use the EtherPad in their future work. In the case of the students, a number recognised the benefits of access to the EtherPad within a conference environment thus using it within the JTEL event. In the case of the educator group, at least one participant recognised the advantage of a collaborative tool such as the EtherPad and was heard to remark that they would use it in their own subject-based project when they returned to their home institution.

Another aspect of usability that is important to note is the ease of use of the ROLE tools. Fundamentally this effects whether the participant or potential end user can actually use the ROLE tool or not. Obviously, many ROLE tools are in development and may be at different stages of maturity. The workshops with the two groups were invaluable, in this respect, because it gave an excellent opportunity to observe as well as document what participants found easy, difficult or even impossible in relation to using the ROLE tools. There were varied responses (as documented earlier). The majority of participants, however, understood how to use all three tools but some did not seem enabled to filter their searches in Binocs and ObjectSpot i.e. reduce or alter selected repository or platform enquiries.

The second emergent theme, in terms of lessons learnt, focuses on the type and style of the learning activity format. How PLEs were introduced, as well as the provision of appropriate learning activity guidelines was paramount in enabling participants to not only become enlivened to explore the learning tools but also provided them with a firm foundation upon which to build and enhance their knowledge of PLEs in general. The underlying assumption being that all members of the two audiences were new to both PLEs as well as to the ROLE project and, therefore, has never used its associated tools either.

As a consequence of preparing the introductory lecture about PLEs and the development of a handy quick start guide for participants in the two workshops to use the pre-selected learning tools, a second set of course materials was later developed for OpenLearn users. This second evolution of the aforementioned materials was designed to be delivered online and used in self-study mode, without the need for a tutor or face-to-face tuition. These online courses have thus offered the opportunity to disseminate information about PLEs and a selection of learning tools to a potentially much wider audience, consisting of communities of informal learners, as outlined in section 3 of this paper.

The third theme to emerge from this case study focusing on the transition from formal to informal learning was of a willingness of participants to engage with the offered learning tools. This could be quantified in a number of different ways. It is the

most crucial of the three themes reported here albeit that it can be described as possibly the most nebulous to measure in its initial stages. In this respect it can be reported that both groups of participants, the learners as well as the educators, were willing to listen and then try out the learning tools in a collaborative fashion. They also appeared to keep an open mind with regard to the idea of PLEs.

What was not anticipated, however, was the level and enthusiasm of some participants who not only enjoyed the exposure to a new (to them) set of learning tools but could also see the relevance of using some of those tools in their own institutions or research work. Thus their willingness to try out the learning tools was converted through a positive learning experience into the realisation that one or more of those tools would aid them in their every day work (either as student carrying out research or in terms of developing project research). This "conversion" built upon the introduction to PLEs that they heard and the associated quick start guide that they were provided with as structured learning activity materials.

Overall, the OpenLearn case study showed that informal learners are looking for accessible and easy to use learning tools, accompanied with introductory and guidance learning course materials. These tools also need to be easily customizable so that they can fit the learners' needs and goals. Informal learners want to be able to receive feedback about their learning progress, as well as provide feedback about the usefulness of the tools and their overall learning experience. Finally, fostering communities of learners that have common learning goals and are willing to engage with novel learning technologies is an essential element towards the successful adoption of PLEs by informal learners.

7 Conclusion and Further Work

The successful implementation of PLEs and their adoption by informal learners involve significant challenges, as shown by the OpenLearn case study. These challenges are related with the different levels of support required by the target audiences, as well as the overall quality of the offered educational tools and services.

Although the lessons learned from the OpenLearn case study are based on evaluations of ROLE technologies, the outcomes are general enough to be potentially useful outside the ROLE project as well. For example, various TEL stakeholders seeking to improve the ways they support learners and educators through PLEs could benefit from this work.

The authors plan to continue evaluating the usefulness of PLEs within a variety of learning contexts and scenarios, both in informal, as well as in formal learning. Additionally, pilots of larger scale are scheduled, as well as the evaluation of pedagogical models for self-regulated learning and tools for supporting learners in becoming self-regulated. These studies will allow the authors to further investigate the potential of PLEs in TEL and acquire a better understanding of the needs of various communities of learners and educators.

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